FUTURE OF E-WASTE MANAGEMENT IN CA: BACKGROUND DOCUMENT

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I.   Introduction

The purpose of the Future of Electronic Waste Management in California project ("Futures") is to examine current conditions and future options for electronic waste management in California and engage stakeholders in exploring how various approaches could address future challenges. CalRecycle staff's vision places emphasis on resource recovery and the waste management hierarchy (reduce, reuse, recycle), ensures public health, and supports CalRecycle's 75% waste reduction goal. It entails a comprehensive e-waste management system that includes focusing on design to encourage product longevity. In addition, the vision is to move away from solely a hazardous waste emphasis and take into consideration a variety of factors such as material recovery value, market trends, current management, and prevalence in the waste stream.

The Electronic Waste Recycling Act of 2003 (SB 20) established a variety of measures intended to develop an infrastructure to provide convenient recycling opportunities, reduce the inappropriate disposal of certain electronic devices, and protect public and environmental heath by ensuring the responsible management of hazardous materials. Since its enactment, the resulting electronic waste management program has been highly successful in collecting and properly handling over 2.2 billion pounds of covered electronic waste generated in the state. The current program has fostered a robust collection and recycling network while significantly relieving local jurisdictions and businesses of the cost burden of managing these wastes and providing free and convenient collection opportunities for all generators.

However, the covered electronic waste (CEW) recycling program currently addresses only certain video display devices. While the CEW program has been successful at managing these devices, CA has one of the smallest scope of products as compared to other states, and there is a missed opportunity in reducing toxicity and waste, and supporting green jobs by not looking at updating the scope.

Newer technologies that are beginning to enter the waste stream often have less intrinsic material value, and are more difficult and costly to manage. Since payment rates in the CEW program are weight-based, payments to collectors and recyclers are decreasing, even as labor costs to dismantle the light-weight devices are increasing. Meanwhile, global economics are disrupting commodity markets and lowering scrap values.

Drawing from over a dozen years of program operational experience since the signing of the Electronic Waste Recycling Act of 2003, as well as the knowledge gained through collaborating with the many states that administer electronic waste management programs of their own, CalRecycle seeks to identify the strengths and weaknesses of current and alternative program approaches. As the Futures project has progressed, CalRecycle has worked with stakeholders to identify overarching goals to guide the development of any changes to the e-waste recycling system. Some of the key goals include ensuring responsible management of hazardous materials, maintaining free and convenient collection opportunities, encouraging environmentally sound design, encouraging reuse, and addressing illegal dumping.

In addition, CalRecycle staff looking at the concept of a circular economy, which has gained momentum over the past several years as an effective management strategy and is widely employed in Europe and Canada. The circular economy is a cycle in which materials flow continuously in the system. A circular economy keeps products, components, and materials in the economy at their highest utility and value for as long as possible to preserve the embedded labor, material and capital costs. It aims to minimize or eliminate waste systematically

throughout the life cycles and uses of products and their components, from raw materials extraction, to design, production/remanufacturing, distribution, consumption/use/re-use/repair, collection and recycling.

The remainder of this document is organized as follows. Section II describes approaches for adding new products to the definition of a covered electronic device. Section III describes potential enhancements to the existing CEW program. Section IV outlines what a Product Stewardship approach to e-waste collection and recycling could look like and Section V describes how the models could address the fundamental goals and essential program elements of a comprehensive e-waste management system.

II.   Consideration of Adding New Products as Covered Electronic Devices
Product Selection Exercise Introduction

One of the key questions in looking at the future of the CEW program is considering whether new product categories should be added to the definition of a covered electronic device. The Electronic Waste Recycling Act of 2003 narrowly defines Covered Electronic Devices (CED) (Public Resources Code 42463(e)(1)) as follows: "Except as provided in paragraph (2), "covered electronic device" means a video display device containing a screen greater than four inches, measured diagonally, that is identified in the regulations adopted by the department pursuant to subdivision (b) of Section 25214.10.1 of the Health and Safety Code." The Program is now 14 years old and some of the electronic products of today were not even on the market when the law was written. Many stakeholders including local government officials and e-waste recyclers have stated that there is a strong need to expand the definition of CED in order to maintain the existing collection and recycling infrastructure, prevent illegal dumping and provide convenient opportunities for California residents.

Several approaches could be taken to select new devices to be covered in the program, as described below. Any approach has challenges including complex definitions and limited reliable data/information on products (e.g., toxicity), and any approach would require legislation to either define products or authorize a rulemaking process to do so. This draft paper presents two possible approaches for discussion at today's workshop:

1. Select an approach that is already used by other states or countries.
2. Undertake a process to define and select various product categories for a potential enhanced California program.

Information on approaches used in other states and countries was briefly discussed at the June 20, 2017 workshop, (see Attachment 2 "Potential Product Categories and Definitions). The Waste Electric and Electronic Equipment (WEEE) Directive defines e-waste as equipment which is dependent on electric currents or electromagnetic fields in order to work properly. Generally speaking (with a few exemptions), if a device has a battery or needs a power supply, it is included in the WEEE definition. In Canada, covered products vary by Province, but all include televisions, computer monitors, CPUs, keyboards, cables, mice, speakers, printers, laptops, notebook computers, and tablets. British Columbia has gone further by identifying an extensive list of covered products similar to the WEEE Directive. Twenty-four other U.S. states have e-waste recycling laws, and covered products vary widely among these. All states include monitors and all but three include televisions. Other commonly covered devices include desktop computers (22 states), e-readers (15 states), printers (14 states), keyboards and peripherals (9 states)[1]. If CalRecycle were to adopt one of these existing schemes, legislation would be required but an extensive evaluation and rulemaking process (i.e., the second approach) should not be required.

The second approach is much more complicated. In order to implement this approach, legislation would be needed to authorize it and then a rulemaking would be needed.   To illustrate how this approach might be implemented, the remainder of this document and the associated E-Waste Product Selection Criteria Table describe a qualitative evaluation exercise recently undertaken by CalRecycle staff. CalRecycle staff presents this description and table as a starting point for analyzing product categories and **is not making a specific recommendation at this time**. Staff used the criteria discussed at the June workshop (i.e., current management, toxicity, prevalence in the waste stream, trends and material recovery value) to evaluate product categories. As part of the overall assessment, staff also considered additional factors such as compatibility with

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[1] Electronics Recycling Coordination Clearinghouse. http://www.ecycleclearinghouse.org/DocRepository/rptProductScope.pdf

current collection and recycling infrastructure, technological challenges, ease of processing, timeline (when would the products become waste), support of the circular economy/resource recovery etc.

In undertaking the qualitative evaluation of product categories, staff gathered readily available data and information. However, more extensive information that could inform this exercise is not readily available in the public domain. Staff used available information to evaluate product categories as falling into one of three general classifications regarding whether or not they should be considered for inclusion in an e-waste management system: high, medium or low. The final column in the E-Waste Product Selection Criteria Table contains a brief explanation of why CalRecycle staff has considered that a product category falls into a particular classification.

This approach has many caveats and limitations, and the evaluation presented here is illustrative only. If the State were to implement this approach, determining how to best do so would require significant discussion with stakeholders and decision makers. Some of the issues arising during the evaluation exercise include:

1. Lack of product specific data regarding composition, toxicity, current recycling methods, sales and use trends, etc. The table is based only on information readily available to staff.
2. What is considered the "product" for the purposes of evaluation and the management system? Should emphasis be placed on a whole product or the component of concern, for example printer versus toner cartridge?
3. Should the product be targeted only at end of life or also further upstream (e.g., to address design/planned obsolescence issues)? This could be notable for some products; e.g., the average lifespan of small household appliances has been cut in half over the last decade.
4. Some categories are adequately covered by existing market, e.g. white goods retail take-back. This raises the question of what the difference is between the current management structure and the gains that could be realized from adding devices to the program.
5. Is collection and recycling of the product category feasible? If the product is added as a CEW, evidence of proper processing and residual flow becomes a relevant consideration. It would be necessary to define what constitutes sufficient processing.

Currently, CED determination requires Department of Toxic Substances Control (DTSC) to determine which covered devices exhibit hazardous characteristics when disposed. Depending on the scope of products targeted for inclusion in an expanded program, changes might be needed regarding how CED determinations are made. The authority to determine acceptable methods of disassembly and treatment also is within DTSC's purview, and DTSC decisions on this affect the economic feasibility of processing products. Expanding the scope of products in the program thus would require discussing many aspects of DTSC's role.

At the October 11, 2017 workshop, the attached E-Waste Product Selection Criteria Table will be used to initiate a dialogue with stakeholders. During the discussion, other approaches may be suggested and explored. Are some criteria more important than the others? For instance, how does consumer convenience compare to the amount of toxic materials used in a product? If there is high value in recovering materials from a device, does that mean that the product category should not be considered even if it can be handled in the same collection and recycling scheme?

Stakeholders are invited and encouraged to provide data that would fill in the gaps and assist in this evaluation. Stakeholders also are encouraged to submit written comments following discussion at the workshop. CalRecycle may present recommendations at a future Public Meeting.

III.   Concepts for Enhancing Existing Fee and Payment Model

This section describes options for enhancing the current California Covered Electronic Waste (CEW) recovery and recycling program to in order to address challenges facing e-waste management now and into the future. By definition, the CEW recycling program currently addresses only certain video display devices. Increasingly complex technologies are being discarded, often with less intrinsic material value, which are more difficult to dismantle and contain components requiring special handling. Meanwhile, global economics are disrupting commodity markets.

Several program enhancements are discussed in this section: 1) add new devices to the definition of a covered electronic device (CED); 2) increase public education and outreach; 3) strengthen and increase manufacturer responsibilities; 4) provide incentives for repair and reuse of electronic devices; 5) establish new market development programs; 6) initiate new research activities; and 7) streamline the submittal of claim documentation.

Legislation would be needed to accomplish any of the seven program enhancements listed above and described in detail below. Legislation should include a stable funding mechanism sufficient to ensure that collectors and recyclers are fully reimbursed for appropriate collection and management activities. In addition, the legislation should include clear definitions of new CEDs, specific management standards for processing new CEDs, clear education and outreach goals, accountability and penalties for new manufacturer requirements, implementation provisions for repair and reuse incentives, and authority for grants and loans. A new structure for both fees charged at retail sale and recovery/recycling payment rates would need to be specified. Currently, CED determination requires the Department of Toxic Substances Control (DTSC) to find that covered devices exhibit hazardous characteristics when disposed. Depending on the scope of products targeted for inclusion, changes may be needed regarding how CED determinations are made. This would require coordination with DTSC to determine if Health and Safety Code (25141.10.1) also needs revision.

Pursuant to new enabling legislation, extensive regulatory revisions would be needed to include new products and establish processes for cancellation, residual management, recordkeeping, claims, etc. A rule making process for new statutory requirements would also be required.

There are several advantages, disadvantages and implementation challenges to this approach.

Advantages of Enhancing the Existing Fee and Payment Model
- Build on an existing successful program with no disruption to existing collection and recycling infrastructure; many collectors and recyclers currently accept non-CEWs as a part of doing business.
- Cost-free and convenient collection opportunities would be available for consumers.
- New CEDs and their residuals would be handled in a manner consistent with current CEW environmental oversight.
- Existing CEW public education and outreach materials can be easily expanded to include new devices; expanded education and outreach requirements would improve consumer understanding of e-waste management options and might influence purchasing behavior.
- CalRecycle internal claim review procedures would remain relatively intact; adding devices would require some new review procedures; tools and databases would require revisions.
- Increased involvement of manufacturers might help influence design for the environment.
- New incentives would help promote repair and reuse activities.

- Streamlined claim documentation submittal would save significant review time and greatly improve efficiency.

Disadvantages of Enhancing the Existing Fee and Payment Model
- Requires legislation and new/revised regulations.
- Requires identification of manufacturers and retailers subject to the CED fee collection system;
- Additional personnel may be needed for CalRecycle and the California Department of Tax and Fee Administration (DTFA, formerly Board of Equalization); may involve expansion of DTFA audits.
- Increased complexity for consumer fee and recycler and collector payment. Due to the potentially wide range of technologies, it would be difficult to obtain data on "average net cost to recycle" CEDs in order to determine appropriate payment rates.
- Depending on the universe of covered devices, it could be difficult to determine and enforce appropriate downstream management standards.
- Fees on today's possibly less hazardous devices cover costs to manage yesterday's more toxic devices.

Challenges and Issues to Address
- Potential challenge for DTFA to identify distribution chains and collect fees from new retail locations.
- Obtaining data on sales and costs to recover and recycle.
- Determining what constitutes cancellation for new CEDs in California.
- Researching and determining appropriate materials management standards and end use destinations for new CEDs and derived residuals claimed in the program.
- Determining appropriate documentation requirements; verification of CA-generated material.
- Coordinating with manufacturers to establish increased requirements that are both meaningful and achievable.

Roles and Responsibilities
- Manufacturers/Producers – Provide information to retailers to identify covered electronic products and have additional responsibility under the enhanced program.
- Retailers – Collect fee at point of sale. Provide consumer information about where to recycle CEDs. May act as a collector in the system.
- Collectors/Recyclers – Register with CalRecycle; follow all applicable statutes and regulations regarding handling of hazardous wastes including proper downstream handling and end-use destination; submit source documentation and payment claims per regulation.
- CalRecycle – Provides oversight and enforcement of program, establishes acceptable material management standards, establishes and communicates documentation requirements for new CEDs, develops (or contracts for) public education and outreach program.
- DTSC – Oversees and enforces the management of hazardous waste.
- Department of Tax and Fee Administration – collects the recycling fees
- Local Government entities – Continue to accept electronic waste at existing HHW collection facilities/events. May act as collector via contract with recycler.
- Consumers – Pay fee when purchasing a covered device. Responsibly handle electronic discards by delivering to authorized collector or recycler.

<u>**Detailed Description of Key Components**</u>

1. Add New Products to the Definition of a Covered Electronic Waste
   <u>Consideration of new products</u>
   - Staff conducted an informal, qualitative review of electronic products that could potentially be added to the definition of a covered product – (See separate section for detailed description.) Products were evaluated based on criteria including current management, toxicity levels, ease of processing, prevalence of product in the waste stream, trends, and material recovery value. Although staff recommends that a process be implemented to evaluate potential new CED, CalRecycle is not making a proposal for specific products or product categories to be added as a CED at this time.
   - Covered entities – Households, schools, businesses, government entities, non-profit organizations.
   - Includes all CED sold for use in California including internet sales.
   - Includes all CED used by a person in California prior to its discard.
   - Includes new, historic and orphan products (without an identifiable producer).

   <u>Implementation steps for CalRecycle once new products are identified</u>
   - Work with stakeholders to determine consumer fee
     o New categories of CED – Should fee on new covered devices be based on size, weight, unit, hazardous material in the device, difficulty of recycling, whether or not device can be repaired/reused, or another factor?
     o Consumer fee should closely reflect actual costs to collect and recycle CED.
     o Need data on current sales, projections, anticipated product lifespan, anticipated rate of entry into waste or repair stream, costs to collect and handle.
     o Modulated fees should be considered – provide cost relief for certain environmentally desirable design features (e.g. recycled content, upgradeability); or conversely, to add cost if environmentally undesirable features are present (e.g. amount of toxic materials).
   - Work with stakeholders to determine recovery and recycling payments
     o New category of CEW – Should recovery and recycling payment rates be based on size, weight, unit, hazardous material in the device, difficulty of recycling or another factor?
     o Repair and reuse – how can the payment rates properly reimburse collectors and recyclers while incentivizing repair/reuse?
     o Base payments on net cost data collected and stakeholder input.
     o Differentiated payment rates may be established for new categories of CEWs.
     o Seek authority to adjust the payment rate for recyclers and collectors annually.
   - Work with DTSC and other stakeholders as appropriate to establish materials management standards for new CEWs
     o What constitutes cancellation?
     o Determine minimum management standards for processing new CEWs to minimize negative environmental impacts from collecting and recycling activities; is compliance with DTSC-administered regulations sufficient?
     o Determine required or allowable cancellation methods and records.
     o Recyclers must cancel devices in California.
     o CEW should be managed for the highest and best use according to California's solid waste hierarchy.
     o Encourage domestic processing – see financial incentives section.

- Determine appropriate processing documentation for new CEW.
    - Identify documentation needed to determine if CEWs are generated from a California source. How to ensure material is eligible, properly weighed, dismantled and that residuals are properly handled?
    - Determine any new mechanisms to claim payments.

2. **Increase Public Education and Outreach**
   a. Require point of purchase information be provided to consumers (see manufacturer responsibility section for details).
   b. Re-establish funding for statewide public education program/materials per statute 42476 (c).
   c. Work with the Office of Education and the Environment to explore whether concepts of e-waste management could be included in the environmental education curricula.

3. **Strengthen and Increase Manufacturer Responsibility**
   a. Strengthen and clarify existing manufacturer reporting requirements to provide more enforcement authority and receive more consistent reports. Manufacturer responsibility and reporting requirements would be extended to new CEDs.
   b. Require manufacturers to label hazardous components (e.g. identify if battery or lamp is present and its location).
   c. Produce public outreach materials for retailers to distribute to consumers at point of purchase. Materials must inform consumer that the device is hazardous and illegal to dispose of in the trash, provide information on where and how device can be collected (website, app or phone number), and information on reparability of device.
   d. Mandatory take-back of certain products that are not conducive to collection at local events/facilities. Would be identified in coordination with manufacturers, collectors and local government HHW program managers.
   e. Manufactures should work towards enhancing durability of their products, promoting repair and reducing waste. Could work with a trade organization to develop durability and recyclability standards. (Like American Plastics Recyclers developed Design for Recyclability guidelines). In addition, have a base level guarantee on their products performance and life expectancy, similar to France's policy requiring manufacturers to have a 2 year warranty on products.

4. **Provide Incentives for Repair and Reuse**
   a. CalRecycle to facilitate partnerships with repair and reuse organizations such as Fixit Clinics, iFixit and The Repair Association
   b. Support "right to repair" legislation in California and at the federal level as appropriate.
   c. Update cancellation requirement to allow for reuse and repair.

5. **Establish New Market Development Programs including Grants and Loans**
   a. Develop new grant programs to support the e-waste collection and management system. Possible grants could include:
      i. Research into new recycling/processing methods.
      ii. Infrastructure grants to encourage domestic processing of non-hazardous e-waste.
      iii. Funding for non-profit repair and reuse organizations.

b. Research feasibility of low-interest loan, or loan guarantee program for recycling/processing.
c. Reinvigorate the Electronic Product Environmental Assessment Tool (EPEAT) state purchasing guidelines and provide information to state purchasing agents.
d. Promote EPEAT guidelines to local governments. Consider limiting CalRecycle grant and payment program funding to entities that follow EPEAT guidelines.
e. Investigate feasibility of adding a "bonus" payment to cover additional transportation costs in very rural areas.

6. Initiate New Research Activities
a. Use the Local Conservation Corps Grant for e-waste management to undertake front line, labor-intensive research as appropriate to meet program needs and in keeping with contract provisions.
b. Partner with national and international organizations on more in-depth research regarding issues such as toxicity, material recovery feasibility, recycling technologies, reparability.
c. Investigate value of a "green seal" type of labeling system that would indicate the ease of disassembly, recycled content and hazardous material contained in the device.

7. Streamline Claim Documentation and Submittal Processes
a. Investigate the feasibility of electronic claim documentation submittal.

Covered Electronic Waste (CEW) Recovery & Recycling Payment System
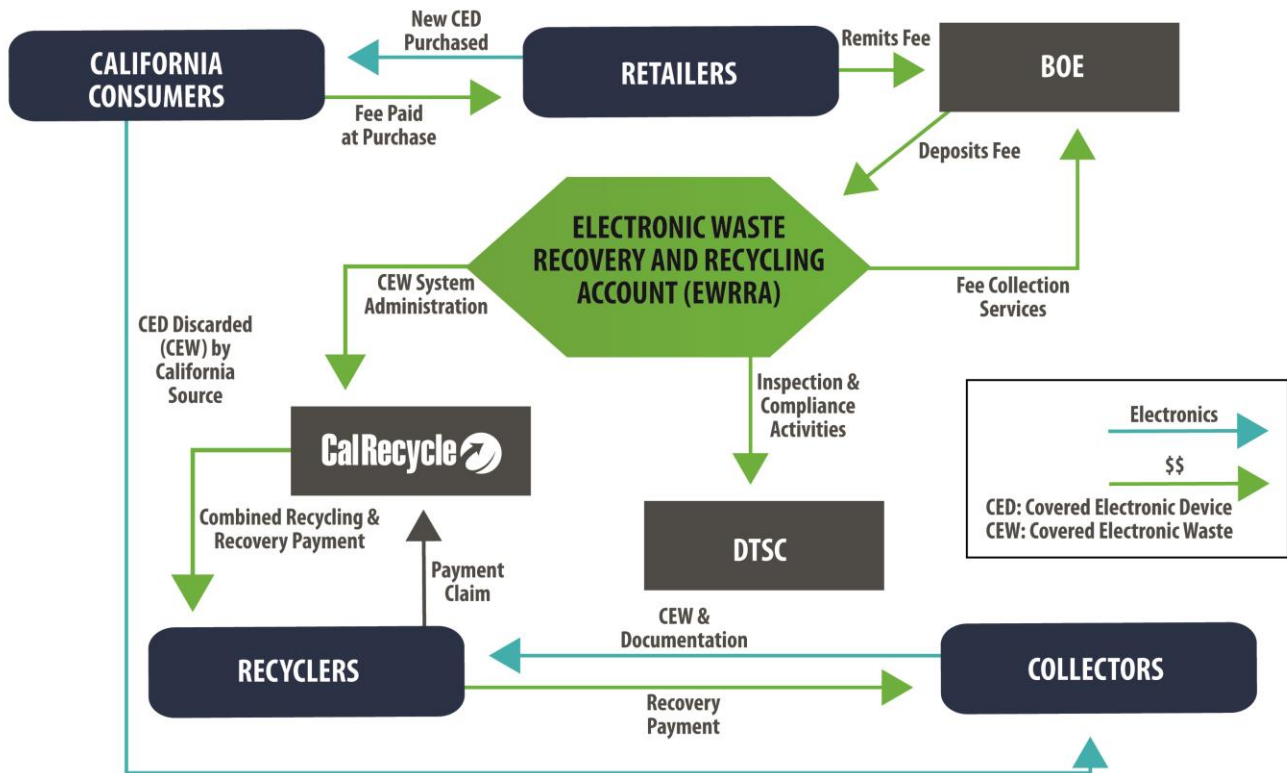
IV. Concepts for Electronic Waste Product Stewardship Model

This section describes a product stewardship approach to collecting and managing electronic waste in California. A comprehensive electronic waste management system based on a Product Stewardship model would have as its foundation CalRecycle's definition of product stewardship and the essential components of an effective stewardship program. Because this would be a new approach in California for the management of e-waste, and because e-waste product stewardship programs in other states do not have all the components that CalRecycle believes are needed to be successful, this document provides a detailed description of these key components.

Product Stewardship is a strategy to place a shared responsibility for end-of-life product management on the producers, users and all entities involved in the product chain, rather than on local government or the general public, to reduce the cradle-to-cradle impacts of a product and its packaging. If the responsibility is placed primarily on producers/manufacturers, then this would be known as Extended Producer Responsibility or "EPR", which has its own defined essential components. This allows the costs of treatment and disposal to be incorporated into the total cost of a product. It sends a market signal to reflect the true environmental impacts of a product, to which producers and consumers respond.

Product Stewardship programs are typically industry-run. Government agencies provide oversight and enforcement but producers are responsible for collecting and managing funds and implementing the program. The programs are not prescriptive and allow flexibility for industry to determine the most cost-effective solutions within parameters established by law or regulations promulgated by government. The most common model requires electronic manufacturers to submit a stewardship plan, either as part of a stewardship organization or as an individual manufacturer detailing their program. Another approach allows manufacturers to opt out by remitting to the Department a fee that is calculated to pay the net average cost of collecting, processing, and recycling hazardous electronic waste.

Sustainable funding is critical to the success of a product stewardship program. Funding must be sufficient to cover the costs of establishing and maintaining a comprehensive collection and management system. Legislation can either require costs to be internalized similar to other costs of doing businesses or authorize a point-of-purchase consumer fee.

Legislation would be needed to establish a comprehensive product stewardship model for electronic waste. It would have to include a sustainable funding mechanism, enforceable goals (or authorization for CalRecycle to establish goals by a specific date), anti-trust provisions, penalties for non-compliance, specific management standards for processing covered devices and residuals, and a number of other provisions that are described below in detail.

There are several advantages, disadvantages and implementation challenges to such a program.

Advantages of Product Stewardship Approach
- Manufacturers and producers (MFR/PR), rather than local governments and taxpayers, take responsibility for the management of their products.
- Those that profit from the sale of products, or that use products, cover the end-of-life management costs rather than the general public. Disclosing the true life cycle cost of a product might influence purchasing behavior.
- Cost-free and convenient collection opportunities would be available for consumers.
- State and local government oversight costs are minimized.

- A Stewardship Organization (SO) or individual Manufacturer/ Producer has the flexibility to design and implement a collection and recycling system that works best for their industry within rules regarding management standards and accountability.
- Discarded electronic devices and their residuals would be processed in an environmentally secure manner with appropriate oversight.
- SOs and MFR/PRs are held accountable for financial and performance practices through independent audits.

Disadvantages of a Product Stewardship Approach
- Requires new legislation and regulations.
- Today's MFR/PRs may have to assume responsibility for legacy devices (possibly with more toxic materials) made by other manufacturers that are no longer in business.
- Depending on how the program is designed, small recyclers and collectors could be at a competitive disadvantage.
- Depending on how the program is designed, local governments may lose control over which recycler they work with.
- Reuse and repair may be treated as a disadvantage towards the sale of new products.
- Without competition, a SO may be incentivized to keep costs as low as possible, potentially resulting in discarded products not being managed to their highest and best use.

Challenges and Issues to Address
- Potential impacts on existing businesses that were established under the E-Waste Recycling Program (SB 20); need to analyze jobs created or lost; avoided disposal costs; infrastructure impacts, etc.
- Transition impacts – Oversight required to ensure that all e-waste continues to be handled in a compliant manner during the transitional period and that collectors/recyclers are appropriately reimbursed for activities during the transition.
- Determining appropriate documentation requirements; verification of CA-generated e-waste.
- Identifying and including a new universe of MFR/PRs.
- Researching and determining appropriate materials management standards and end use destinations for variety of newly covered e-waste and derived residuals.
- Articulate clear, measurable and enforceable goals

<u>Detailed Description of Key Components</u>

Definitions
- Manufacturer/Producer (MFR/PR) is either 1) the person who manufactures the covered product and who sells, offers for sale, or distributes the product in the state; 2) imports the product into the state for sale or distribution; or 3) sells the product in the state.
- Stewardship Organization (SO) is an entity formed by a group of producers to act as an agent on behalf of the producers to administer a product stewardship program.

Scope
- Includes all MFR/PRs that sell electronic devices for use in CA.
- Covered products will be determined and established in statute or as part of a rule making process. CalRecycle could choose to adopt an existing product scheme used in other states and countries, or evaluate products using specified criteria.
- Covered entities: Households, schools, businesses, government entities, non-profit organizations.

- Includes new, historic, and orphan products (without an identifiable producer).
- Includes all sales into CA or for use in CA, including internet sales.
- Requires statewide coverage, both urban and rural.

Roles and Responsibilities
- Manufacturers/Producers – Design, finance and operate the program, either as individuals or as part of a Stewardship Organization (SO). Register with CalRecycle in order to sell covered products in CA. SO or individual MFR/PR submits plans describing how the goals of the program will be accomplished and subsequent reports as defined by CalRecycle. Individual manufacturer or SO ensures that all entities associated with program implementation (collectors, recyclers, local governments) are reimbursed for eligible activities, and provides outreach and education.
- Retailers – If a point of purchase fee is established in legislation, retailers collect the fee on sales of new covered products and remit it to the SO. May accept electronic devices from consumers as a collector and receive reimbursement from the SO. Assist with public outreach and education by providing point of purchase consumer information.
- Collectors, Recyclers/Processors – Multiple approaches can be taken: 1) collectors and recyclers contract with the SO to accept and appropriately handle covered electronic waste and receive reimbursement from SO; 2) SO selects smaller group of recyclers through a competitively bid process to appropriately handle e-waste on their behalf and receive reimbursement from the SO; or 3) the state (CalRecycle) approves recyclers to participate in the program who then contract directly with the SO to provide processing services. Other models are also possible, but any model must include the following elements:
  - Collectors and recyclers receive reimbursement from SO for appropriate and compliant collection and processing activities.
  - Collectors and recyclers must follow all applicable statutes and regulations for managing hazardous materials.
  - Recyclers must be certified by third party organization (R2 or e-Stewards) or equivalent operating standards.
  - Submit annual reports to SO and CalRecycle.
- CalRecycle – Provides oversight and enforcement of program; reviews and approves plans, budgets and reports from the SO to determine if program goals are being met. Ensures that independent third party audits are conducted for both financial and non-financial performance aspects of program implementation. Assesses fines and penalties if the stewardship organization is found to be out of compliance.
- DTSC – Oversees and enforces the management of hazardous waste.
- Local government entities – Continue to accept electronic waste at existing HHW collection facilities/events. May act as collector via contract with producers or SO and receive reimbursement for compliant collection activities from SO. Assist with public education and outreach.
- Consumers – Pay fee when purchasing a covered device if a visible fee is established in legislation. Responsibly handle electronic discards by delivering to authorized collector or recycler.

Financing – Legislation authorizes a financing mechanism that is sufficient to fully cover the costs of the SO's e-waste collection and recycling program, including state administrative costs and education/outreach efforts.
- Requires program costs to be internalized similar to other costs of doing businesses (see Image 2, page 15) or establishes a visible point-of-purchase consumer fee (See Image 3, page 16).

- Costs must be apportioned in an equitable manner determined by market share or a combination of market share (based on manufacturer share of current or recent sales) and return share (based on brands returned in the system plus a share of orphan products. Specific financing scheme is established in legislation. Several models are used in other states and countries; CalRecycle would analyze these approaches to determine the most effective model for California.
- Collectors, recyclers and local governments must be fairly compensated for appropriate collection and processing activities conducted under the program; including labor, transportation and processing costs.
- No end-of-life fee can be charged to consumers for discarding covered products.
- "Modulated fees" can be incorporated to provide cost relief for certain environmentally desirable design features (e.g. recycled content, upgradeability, longevity); or conversely, to add cost if environmentally undesirable features are present (e.g. amount of toxic materials).
- Authorizes an account at CalRecycle to accept fees/penalties dedicated to program-related enforcement and oversight activities.

Goals and Measurement
- Clear, measurable and enforceable goals are established in legislation or by CalRecycle if so delegated by legislation.
- Must include both performance goals (amount of material reused or recycled) and convenience goal (adequate recycling opportunities for public).
  - Performance goal concepts – Various approaches have been used. Examples include: 1) industry-wide weight-based collection and recycling goal (potentially pounds per capita); 2) recycling target allocated on a proportional "market share" for each registered MFR/PR based on sales of covered products; 3) proportional "return share" with recycling targets apportioned to MFR/PR for products of their own brands returned through the system over a certain number of years; 4) combination of market share and return share. One challenge with market share is light-weighting of devices. One approach that has been used elsewhere is establishing recycling target by unit rather than by weight or by weight of the specific material of concern (e.g. battery or lamp) rather than the whole device. Some countries have established a per pound penalty for not reaching the recycling target and allow, "trading or selling" of any excess pounds collected. In order to ensure rural coverage and encourage reuse, some states/countries provide "extra credit" for collection in very rural/remote communities or for donations to schools or non-profits.
  - Convenience goal – Collection opportunities must be provided year round and available to residents in rural areas. Examples of collection goals include: a minimum of one collection opportunity per 10,000 residents and one per county; 90% of population must reside within 15 miles of collection opportunity. Either of these approaches should be coupled with a rural/remote goal; either access to at least one annual collection; or a collection opportunity within 25 miles of miles of retailer selling similar device assumes that if consumer travels to retailer to purchase, they can travel same distance to recycle).

Stewardship Organization Plans, Budgets, and Annual Reports
- The SO or individual MFR/PR will conduct business in a transparent manner and is accountable to CalRecycle for implementation of their plan. Plans and reports will be approved by CalRecycle in a public meeting.
- The SO or individual MFR/PR submits a Stewardship Plan that describes the collection, processing and ultimate destination for covered products and demonstrates how the primary goals will be achieved. The Plan should also include strategies for managing and reducing the life cycle impacts of a covered product, for example: reduction in the use of hazardous substances; reuse, reparability and product longevity; the use of virgin material in the manufacture of a product; recycled content.

- Program performance must be demonstrated by the SO or individual MFR/PR via annual reports. Reports must contain sufficient data for CalRecycle to determine if the goals in the Stewardship Plan are being achieved and to enforce the requirements of the law including: pounds of e-waste collected; source of all devices collected and claimed; pounds transferred to another recycler; pounds recycled; and ultimate destinations (see also Environmental Responsibility section).
- The Stewardship program will include the establishment of an Advisory Committee comprised key stakeholders to provide input on the Stewardship Plan and ongoing feedback during program implementation.
- Budgets (submitted in stewardship plan for approval by CalRecycle) must be sufficiently detailed to describe how all program costs will be covered. Budget also must outline a contingency plan should anticipated revenue not cover program activities for the full year. Program must be offered on a continual basis and meet the convenience standard even after collection goals are realized.
- Budgets must provide transparency and verify that funds generated in California are spent on the California program.
- Independent, third party audits are required of the financial systems and the collection and processing systems including ultimate dispositions of e-waste and associated residuals.

Materials Management Standards – Program operations and materials management activities must be compliant with existing rules regarding hazardous and universal waste management for electronic devices (DTSC regulations) and must conform to US EPA regulations.
- SO is responsible for ensuring that products are managed for highest and best use according to California's solid waste hierarchy (e.g., address source reduction, product design, reuse and materials recovery in addition to recycling).
- Encourages domestic processing and utilization of recycled materials.
- Retain existing E-waste program's requirement that recyclers must dismantle device before claiming it toward their recycling target.
- SO ensures that downstream processors adhere to best management practices that minimize negative environmental outcomes within the state and elsewhere.
- Recyclers must certified by a third party organization such as R2 or e-Stewards or equivalent.
- Annual reports submitted by SO detail end use destinations for all material claimed in the program.

Enforcement – Legislation authorizes CalRecycle to take enforcement action for non-compliant activities including sales bans and the levying of fines and penalties.
- Provides enforcement provisions in conjunction with existing provisions and enforcement for management of hazardous and universal waste by DTSC.
- Ensures that any penalties assessed on SO or individual MFR/PR are not paid for using program fee assessments but rather paid for by MFR/PR.
- Administrative costs for state for oversight and enforcement activities are covered by MFR/PR registration fees; or otherwise reimbursed by the SO's financing plan.

Education & Outreach
- SO or individual MFR/PR has lead role for consumer outreach and education. Efforts should be coordinated with retail outlets to ensure that point-of-purchase information is provided to consumers purchasing electronic devices. Point of purchase information should include statement that device may be hazardous and must be disposed appropriately. Also must provide information on how/where to dispose of device.

Reuse, Repair and Design for the Environment

- MFR/PRs will work towards enhancing durability of their products, promoting repair and reducing waste. Could work with a trade organization to develop durability and recyclability standards. (e.g. American Plastics Recyclers developed Design for Recyclability guidelines.) Products should be designed to facilitate repair, recycling and minimize negative environmental impacts; e.g. longevity, ease of disassembly, recycled content, and reduced hazardous materials in products. One legislative approach is to incorporate "modulated fees" to provide cost relief for certain environmentally desirable design features (e.g. recycled content, upgradeability); or conversely, to add fees if environmentally undesirable features are present (e.g., amount of toxic materials).
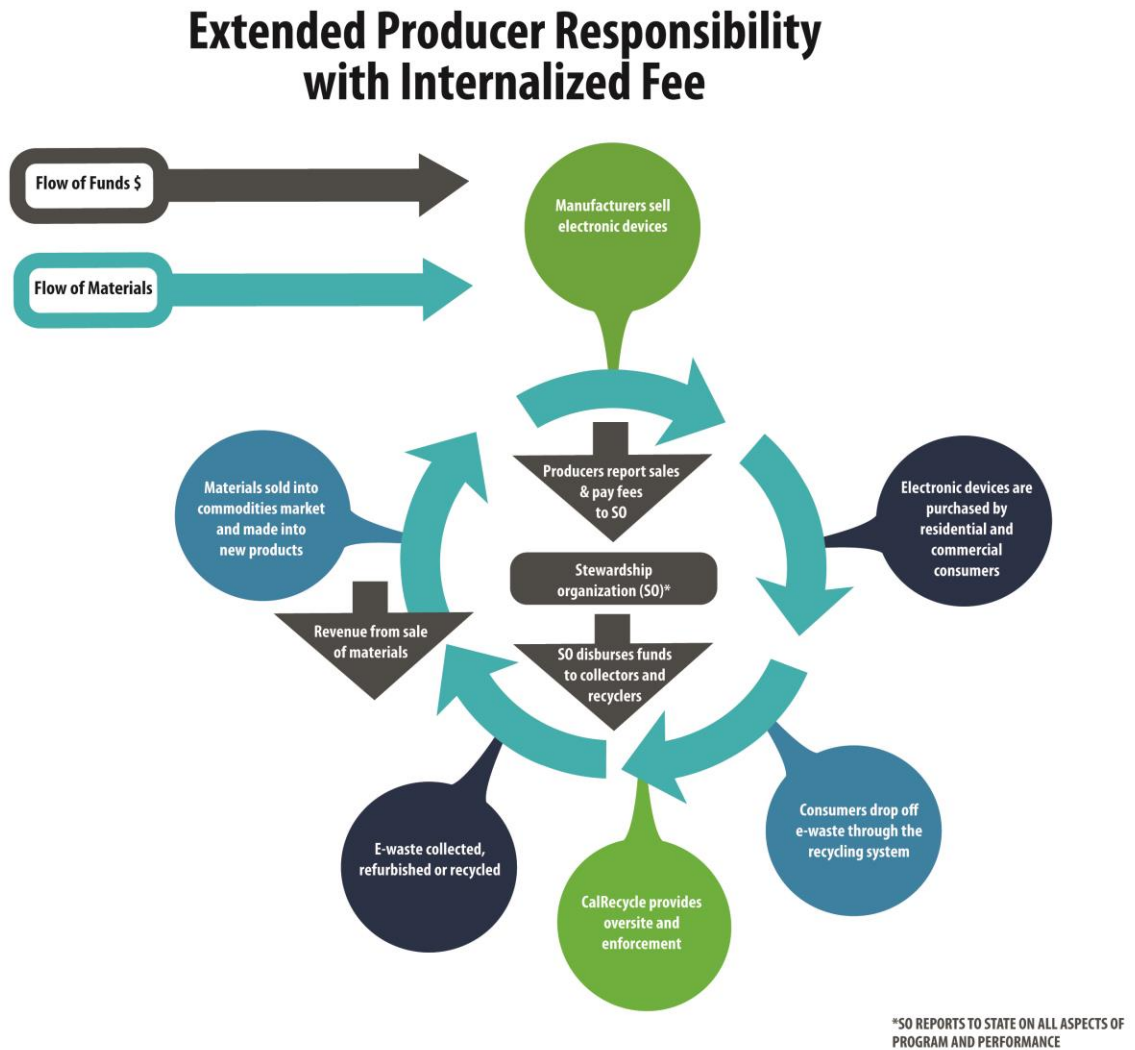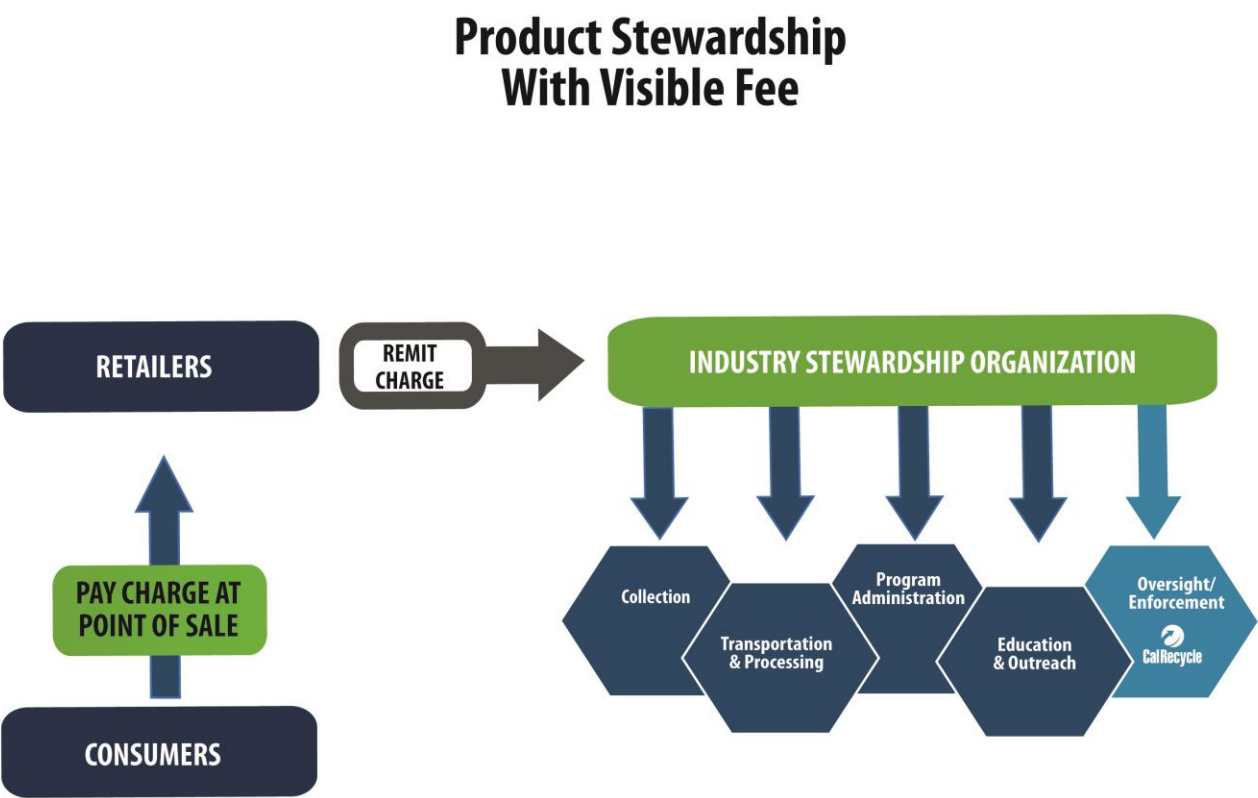
Image 2: EPR model with Internalized Fee

Extended Producer Responsibility with Internalized Fee

Flow of Funds $

Flow of Materials

Manufacturers sell electronic devices

Producers report sales & pay fees to SO

Materials sold into commodities market and made into new products

Stewardship organization (SO)*

Electronic devices are purchased by residential and commercial consumers

Revenue from sale of materials

SO disburses funds to collectors and recyclers

E-waste collected, refurbished or recycled

CalRecycle provides oversite and enforcement

Consumers drop off e-waste through the recycling system

*SO REPORTS TO STATE ON ALL ASPECTS OF PROGRAM AND PERFORMANCE

V. How the Models Address Fundamental Goals and Essential Components

This section describes overall goals and program components of an effective e-waste management system and discusses how the two major models (Enhancing the Existing Fee and Payment System; and the Product Stewardship Model) might address these factors. In July 2016, CalRecycle conducted a stakeholder survey to solicit input on the Futures project. Among other topics, stakeholders were asked to discuss concerns facing the e-waste collection system, identify fundamental goals for the program, and describe essential components or elements of a comprehensive e-waste management system. Discussion at the September 2016 workshop further refined these goals and program elements.

The previous sections described two models for expanding the current e-waste management program. Regardless of the model, all of the following program elements identified by stakeholders as essential can be addressed with careful program design.

Essential Program Elements of Any Model:
1. Sustainable funding for program implementation;
2. Flexibility in program rules to accommodate changing markets;
3. Collection and convenience goals that are clear and measurable;
4. Ensuring a level playing field;
5. Enforcement, inspection and oversight;
6. Regular required reporting on collection, processing, recycling methods and destination; and
7. Consumer education.

Fundamental Goals of an Expanded E-Waste Program
Stakeholders also identified key fundamental goals. CalRecycle staff have taken that input and propose that the following goals should be key to any new legislation:
1. Ensure responsible management of hazardous materials;
2. Foster innovative and environmentally sound recycling technologies;
3. Provide free and convenient collection opportunities for consumers;
4. Maximize efficient recovery of materials;
5. Encourage environmentally sound product design practices – design for recycling, recycled content material in product and packaging, reduce planned obsolescence, less hazardous material;
6. Encourage reuse;
7. Promote and encourage processing within California; and
8. Address illegal dumping.

The table on the following page compares staff's assessment of how the current fee and payment system, an enhanced fee and payment model, and a product stewardship model each fare in terms of their ability to include these fundamental goals.

How the Models Address the Goals

FUNDAMENTAL GOALS	Current Fee and Payment Program	Enhanced Fee and Payment Model	Product Stewardship Model
1. Ensure responsible management of hazardous materials	Yes, cancellation required and no payment made until glass is shipped and end destination is identified	Yes, keep existing controls	Yes, build requirements into legislation; certified recyclers must provide downstream destination
2. Foster innovative and environmentally sound recycling technologies	Not directly	Can be built into program design	Yes, can be built into program design
3. Provide free and convenient collection opportunities for consumers	Yes, currently free for CEWs	Yes, keep existing free collection	Yes, would be mandated - otherwise consumers pay twice (both the internalized cost as well drop off)
4. Maximize efficient recovery of materials	Not directly, but nothing in the current system prevents this from happening	Depends on program design and markets	Depends on program design and markets; manufacturers will likely want to do bare minimum to meet their goals
5. Encourage environmentally sound product design practices – design for recycling, recycled content material in product and packaging, reduce planned obsolescence, less hazardous material	No	Could be encouraged through modulated fees and incentives	Yes, could be encouraged through modulated fees and incentives
6. Encourage reuse	No, existing rules require cancellation	Yes, build incentives into program design	Yes, build incentives into program design
7. Promote and encourage processing within California	Yes, require cancellation in CA	Yes, keep existing controls	No, not particularly; could design incentives
8. Address illegal dumping	Current rules makes it cumbersome to collect illegally disposed devices	Could be encouraged through local government funding such as grants	Would need to mandate that manufacturer account for it in their plan